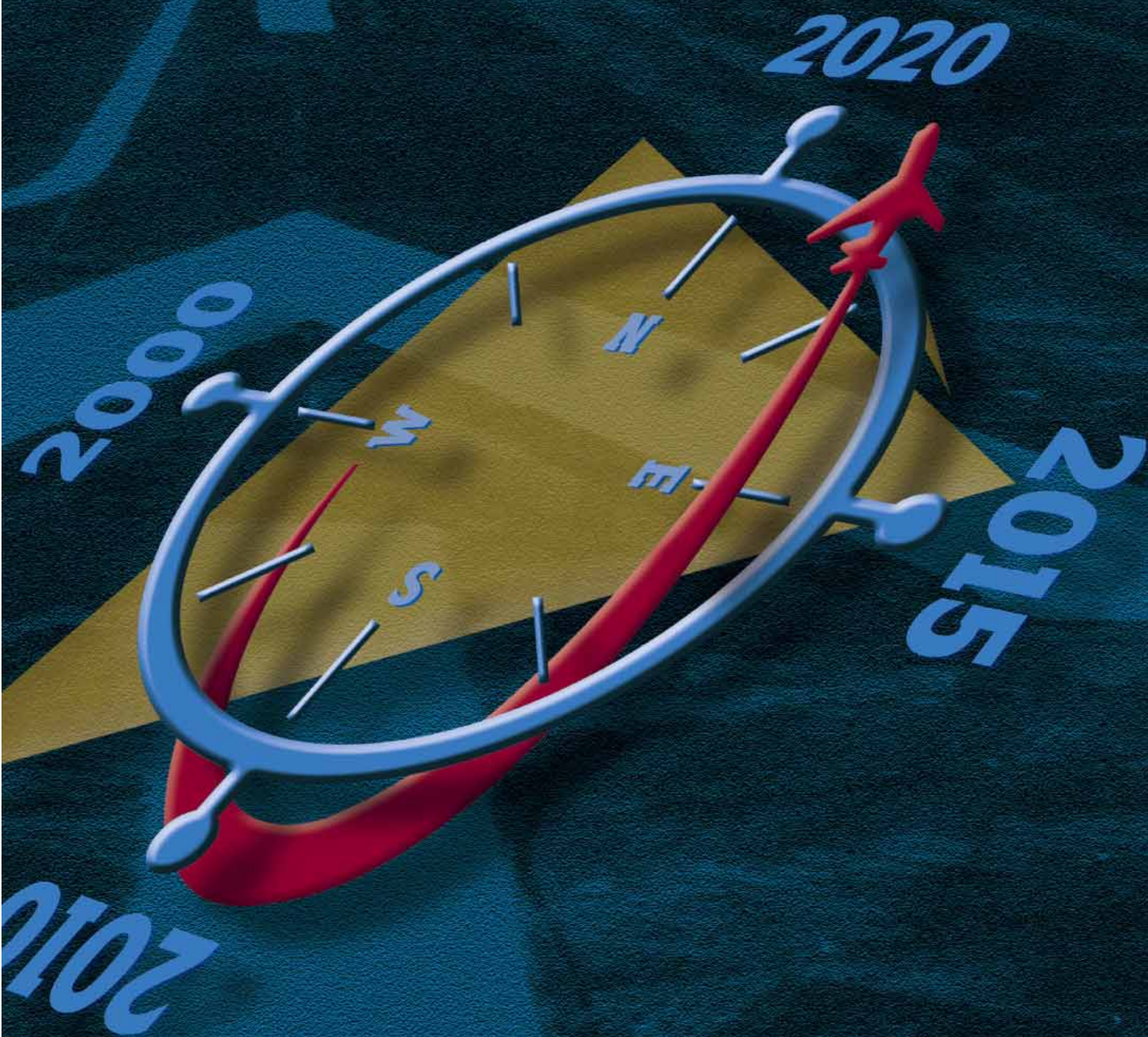


APPENDIX B:
POPULATION ANALYSIS
METHODOLOGY



POPULATION ANALYSIS METHODOLOGY

The population analysis component of the VATSP was completed in May 2001. The analysis calculated affected population for three drive time intervals. The intervals were:

- › 45 minutes from a commercial service airport.
- › 30 minutes from a general aviation airport
- › 45 minutes from a commercial airport OR 30 minutes from a general aviation airport

Phase 1 – Data Acquisition.

Drive Time Contours – Street network files for the Commonwealth of Virginia were obtained from Environmental Systems Research Institute (ESRI) U.S. Street Database Files. Each road segment was assigned a speed limit based on size and road type. Utilizing this information, a time per road segment calculator was created. The files were then processed through ESRI's Network Analyst and subsequent polygons were created that displayed driving distances based on time. Polygons were created for the three drive time intervals defined above.

Population Data – Year 2000 and 2010 population data was collected for the Commonwealth of Virginia at the Census Block Group Level. The provider of the demographic data, Applied Geographic Solutions, has been used in previous HNTB Corp. population analysis studies including the Potomac TRACON EIS and the Roanoke Airport Noise Exposure Map.

Geographic Data – Census Block geography files for the Commonwealth of Virginia were obtained from ESRI Data and Maps. These files provide comprehensive statewide polygons with an underlying table structure similar to the Applied Geographic Solutions (AGS) Block Group projections. The similarity in the two file structures allows for relationships to be created and for the demographic data to be attached to the geographic files as attributes.

Phase 2 – Analysis

The population analysis component of the VATSP was conducted in a step process. This process allows for streamlining and consistency between the three drive time intervals.

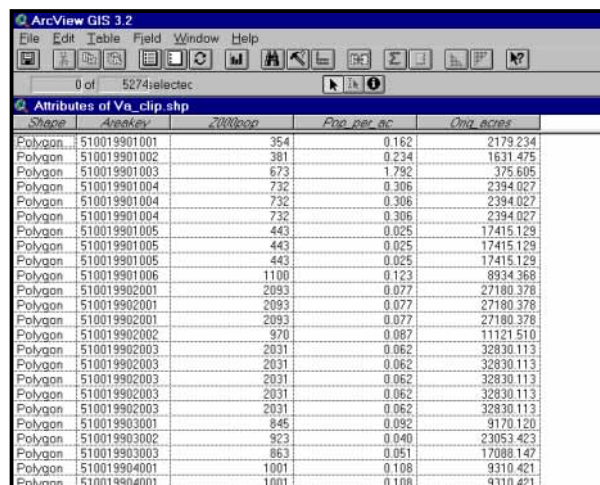
The steps were:

- › Calculation of population per acre at block group level to create a population multiplier.
- › Clipping drive time contours into block groups and subsequent calculation of acreage for each clipped Block Group.
- › Multiplying clipped Block Group acreage by population multiplier to derive total affected population. Subsequent division of total affected population into total state population to derive percentage of state population within the drive time interval.

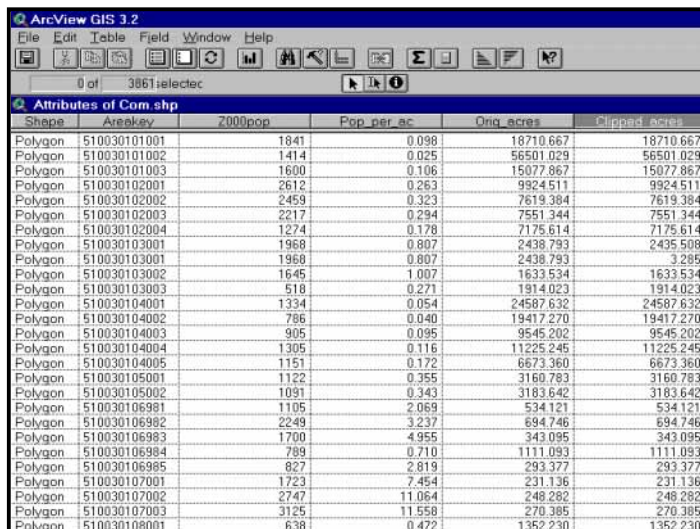
The step process is defined below. The analysis was completed using ESRI's *ArcView* software.

Step 1 – Calculation of population per acre.

The Applied Geographic Solutions 2000 Census Block Group projections are joined to ESRI's Block Group geography. Total acreage is then calculated for each Block Group record. The Block Group total population for each record is then divided into the Block Group acreage for each record to derive a population per acre multiplier for each Block Group.



Shape	Acreage	2000pop	Pop_per_ac	Orig_acres
Polygon 510019901001	354	0.162	2179.234	
Polygon 510019901002	381	0.234	1631.475	
Polygon 510019901003	673	1.792	375.605	
Polygon 510019901004	732	0.306	2394.027	
Polygon 510019901004	732	0.306	2394.027	
Polygon 510019901004	732	0.306	2394.027	
Polygon 510019901005	443	0.025	17415.129	
Polygon 510019901005	443	0.025	17415.129	
Polygon 510019901005	443	0.025	17415.129	
Polygon 510019901006	1100	0.123	8934.368	
Polygon 510019902001	2093	0.077	27180.378	
Polygon 510019902001	2093	0.077	27180.378	
Polygon 510019902001	2093	0.077	27180.378	
Polygon 510019902002	970	0.087	11121.510	
Polygon 510019902003	2031	0.062	32830.113	
Polygon 510019902003	2031	0.062	32830.113	
Polygon 510019902003	2031	0.062	32830.113	
Polygon 510019902003	2031	0.062	32830.113	
Polygon 510019902003	2031	0.062	32830.113	
Polygon 510019903001	845	0.092	9170.120	
Polygon 510019903002	923	0.040	23053.423	
Polygon 510019903003	863	0.051	17088.147	
Polygon 510019904001	1001	0.108	9310.421	
Polygon 510019904001	1001	0.108	9310.421	



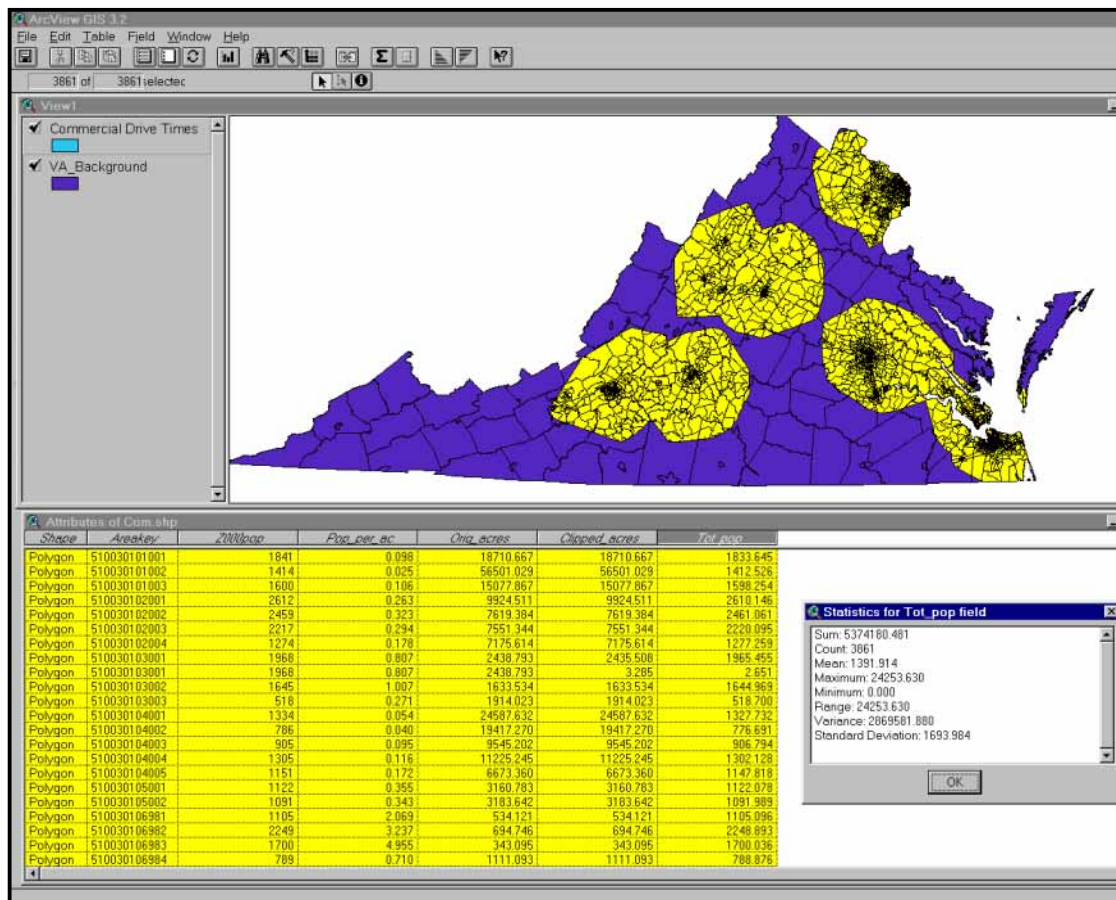
Shape	Acreage	2000pop	Pop_per_ac	Orig_acres	Clipped_acres
Polygon 510030101001	1841	0.098	18710.667	18710.667	
Polygon 510030101002	1414	0.025	56501.029	56501.029	
Polygon 510030101003	1600	0.106	15077.867	15077.867	
Polygon 510030102001	2612	0.263	9924.511	9924.511	
Polygon 510030102002	2459	0.323	7619.384	7619.384	
Polygon 510030102003	2217	0.294	7551.344	7551.344	
Polygon 510030102004	1274	0.178	7175.614	7175.614	
Polygon 510030103001	1968	0.807	2438.793	2438.793	
Polygon 510030103001	1968	0.807	2438.793	2438.793	
Polygon 510030103002	1645	1.007	1633.534	1633.534	
Polygon 510030103003	518	0.271	1914.023	1914.023	
Polygon 510030104001	1334	0.054	24587.632	24587.632	
Polygon 510030104002	766	0.040	19417.270	19417.270	
Polygon 510030104003	905	0.095	9545.202	9545.202	
Polygon 510030104004	1305	0.116	11225.245	11225.245	
Polygon 510030104005	1151	0.172	6673.360	6673.360	
Polygon 510030105001	1122	0.355	3160.783	3160.783	
Polygon 510030105002	1091	0.343	3183.642	3183.642	
Polygon 510030106981	1105	2.069	534.121	534.121	
Polygon 510030106982	2249	3.237	694.746	694.746	
Polygon 510030106983	1700	4.955	343.095	343.095	
Polygon 510030106984	789	0.710	1111.093	1111.093	
Polygon 510030106985	827	2.819	293.377	293.377	
Polygon 510030107001	1723	7.454	231.136	231.136	
Polygon 510030107002	2747	11.064	248.282	248.282	
Polygon 510030107003	3125	11.558	270.385	270.385	
Polygon 510030108001	638	0.472	1352.230	1352.230	

Step 2 – Clipping Drive Time Contours into Block Groups.

The drive time contours are clipped into the Census Block files and a resultant clipped Block Groups file is created. Acreage is recalculated for the clipped block groups.

Step 3 – Multiplying clipped Block Group acreage by the population multiplier.

The acreage for the clipped block groups is multiplied by the population per acre multiplier. A subsequent resultant affected population total is derived. The analysis for commercial airport drive times is shown below.



Phase 3 – Results

The results of the three drive time intervals are shown below. 2000 and 2010 are the study years for the analysis.

2000 Population Analysis

Virginia Total 2000 Population = 6,928,327

Virginia Total 2000 Population within 45 minutes of a commercial airport = 5,374,180 or 77.57%

Virginia Total 2000 Population within 30 minutes of a general aviation airport = 5,541,939 or 79.99%

Virginia Total 2000 Population within 45 minutes of a commercial airport or 30 minutes of a general aviation airport = 6,732,945 or 97.18%

2010 Population Analysis

Virginia Total 2010 Population = 7,659,065

Virginia Total 2010 Population within 45 minutes of a commercial airport = 5,992,471 or 78.24%

Virginia Total 2010 Population within 30 minutes of a general aviation airport = 6,173,063 or 79.99%

Virginia Total 2000 Population within 45 minutes of a commercial airport or 30 minutes of a general aviation airport = 7,453,580 or 97.18%